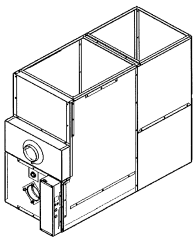
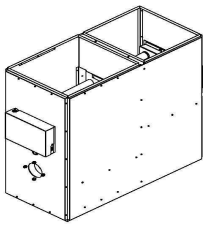
# Installation, Operation and Service Manual

## GEMINI 3T & 5T / ECLIPSE 3T

**85% + EFFICIENCY**
**OIL FIRED LOWBOY FURNACE**

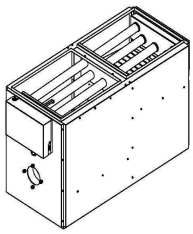


(KLF-..-K..) FRONT

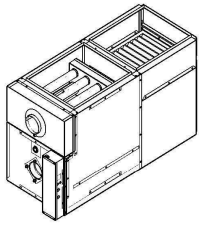


(KLR-..-K..) REAR

**GEMINI 3T & 5T**



(KLR-..-E..) REAR



(KLF-..-E..) FRONT

**ECLIPSE 3T**

**INSTALLATIONS MUST MEET ALL LOCAL AND FEDERAL CODES THAT MAY DIFFER FROM THIS MANUAL**

***Please read the manual in its entirety before beginning installation. This manual must be kept with the furnace for future reference.***

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**G2012-E7 Rev. E**

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# 1.0 IMPORTANT SAFETY ADVICE

**Please read and understand this manual before installing, operating or servicing the furnace.** To ensure you have a clear understanding of the operating procedures of the unit please take the time to read the **IMPORTANT SAFETY ADVICE section** of this manual.

## WARNINGS

**NEVER** burn garbage or paper in the unit.
**NEVER** store combustible material around it.
**DO NOT** attempt to start burner when excess oil has accumulated, when unit is full of vapour or when heat exchanger is very hot.
**DO NOT** use gasoline, crankcase draining's or any oil containing gasoline.

## CAUTION

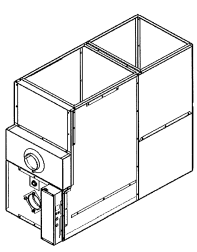
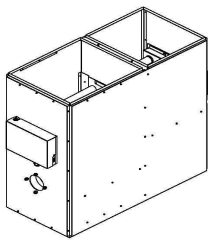
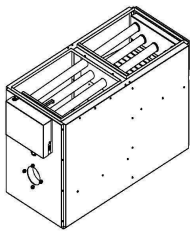
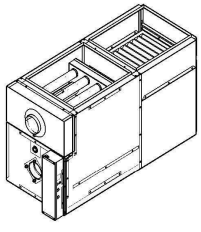
**DO NOT** START THE BURNER UNTIL ALL FITTINGS, COVERS AND DOORS ARE IN PLACE. **DO NOT** TAMPER WITH THE FURNACE OR CONTROLS, CALL A QUALIFIED BURNER TECHNICIAN. **DO NOT** STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPOURS AND LIQUIDS IN THE VICINITY OF THIS UNIT OR ANY OTHER APPLIANCE.

## DANGER

**Do not use this furnace as a construction heater. Use of this furnace as a construction heater exposes it to abnormal conditions, contaminated combustion air and lack of air filtering. Failure to follow this warning can lead to premature furnace failure which could result in a fire hazard and/or bodily harm and/or material damage.**

## IMPORTANT

This manual contains instructional and operational information for the GEMINI 3T & 5T/ ECLIPSE 3T OIL-FIRED FURNACE. Read the instructions thoroughly before installing furnace or starting the burner. Consult local authorities about your local FIRE SAFETY REGULATIONS. All installations must be in accordance with local state or provincial codes. Improper installation will result in voiding of warranty.

# 2.0 PRODUCT INFORMATION

**CLEARANCE (minimum) TO COMBUSTIBLES**

| | | |
|---|---|---|
| Top of Supply Plenum | 1” | (25 mm) |
| Front (Maintenance) | 24” | (610 mm) |
| Rear (Maintenance) | 24” | (610 mm) |
| Side – Non-Access | 1” | (25 mm) |
| Side – Access maintenance | 24” | (610 mm) |
| Flue Pipe | 9” | (229 mm) |

Floor (Can be installed directly on combustible or non-combustible)

**DRAFT PRESSURE**

Breech draft pressure -0.01” wc minimum

**AIR/BLOWER DATA**

| | |
|---|---|
| Maximum external static pressure | 0.5” wc |
| Maximum cooling unit capacity | 3.0 tons & 5.0 Tons |
| Maximum air temperature rise | See pages 13,14 and 26 |
| High Limit temperature | 185℉ |
| Thermostat anticipator | See thermostat instructions |

**MOTOR/BLOWER**

Gemini 3T / Eclipse 3T: 1/2 hp 4 Speed / G10-8 DD or 1/2 hp ECM / G10-8
Gemini 5T: ¾ hp / G12-10 DD or ¾ hp ECM / G12-10 DD

**FAN/HIGH LIMIT CONTROL**

Honeywell ST9103A1028 Fan Center & Thermo-Disk (7” stem)

**THERMOSTAT**

Any wall thermostat

**FUEL**

Not heavier than No. 2 furnace oil.

**ELECTRICAL** – 120 Volts, 60 Hz

| | |
|---|---|
| Canada | Less than 12 amps. circuit protection 15 amps. |
| USA | 13.3 amps, circuit protection 20 amps. |

**FLUE-PIPE CONNECTION**

5” Chimney **or** Direct Vent DVS Granby kit

**CLEANOUTS**

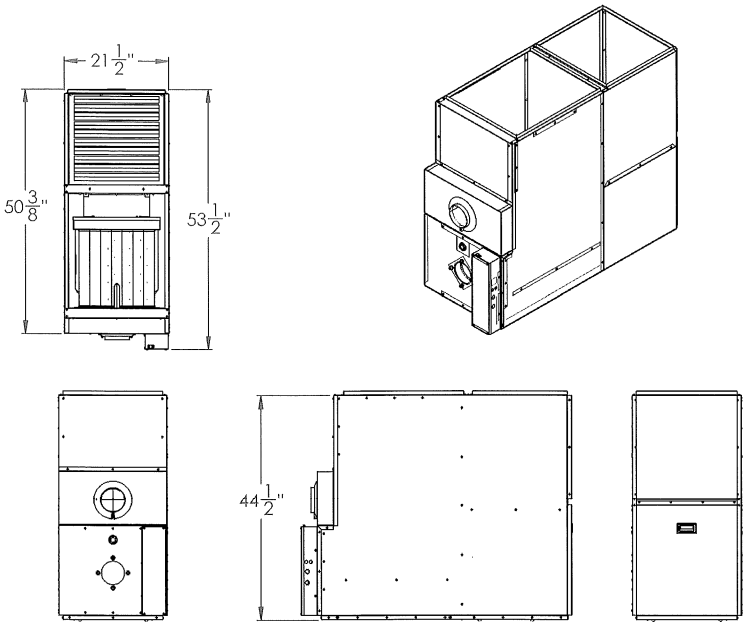
Rear Cover & Burner Opening

**AIR FILTERS**

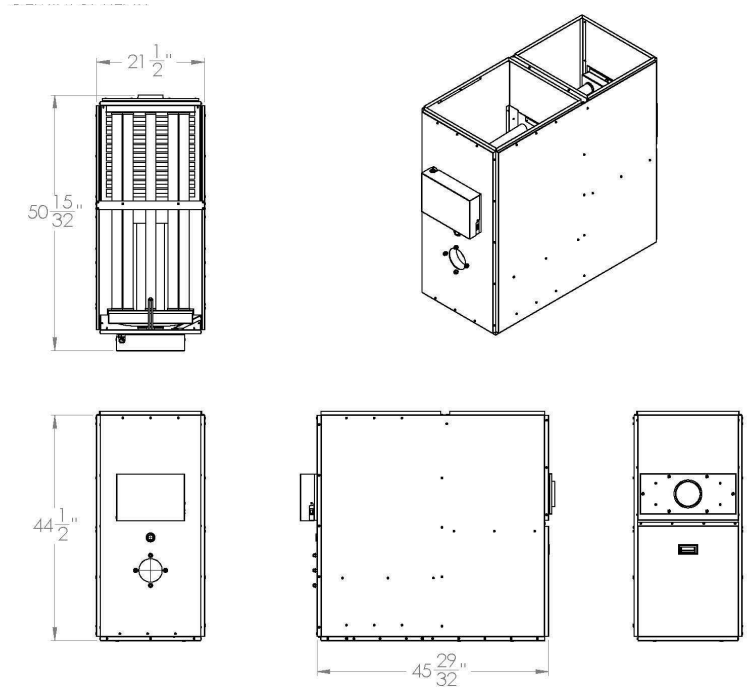
Gemini 3T / Eclipse 3T : 20” x 20” x 2” non pleated UL approved
Gemini 5T Rear: 20” x 20” x 2” & 15” x 20” non pleated UL approved
Gemini 5T Front: Two 15” x 20” non pleated UL approved

**PLENUM (GEMINI 3T & 5T) REAR / FRONT**

| | | |
|---|---|---|
| Cold air return | 19” x 20” | (483 x 508 mm) |
| Hot air supply | 23-7/8” x 20” | (606 x 508 mm) |
| Plenum spacing | 3T: 1-3/4” | (45mm) |
| | 5T: 2-3/4” | (70mm) |



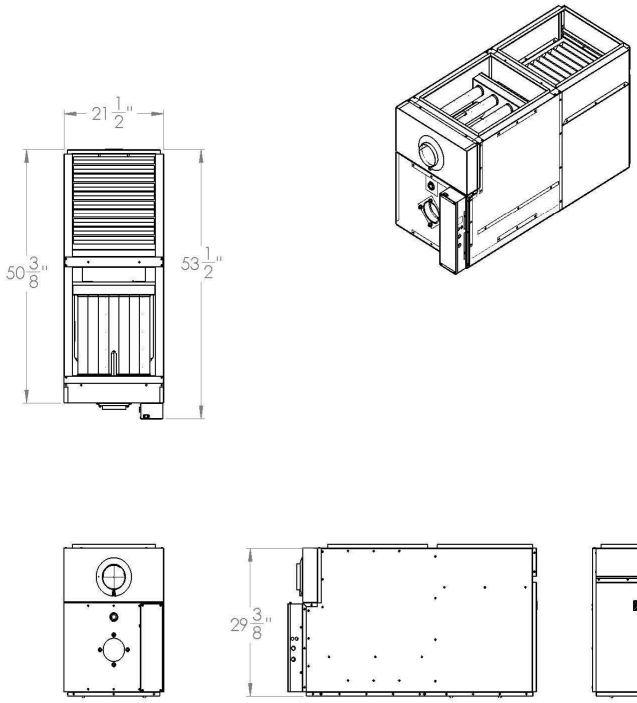

**GEMINI 3T/5T FRONT (KLF)**



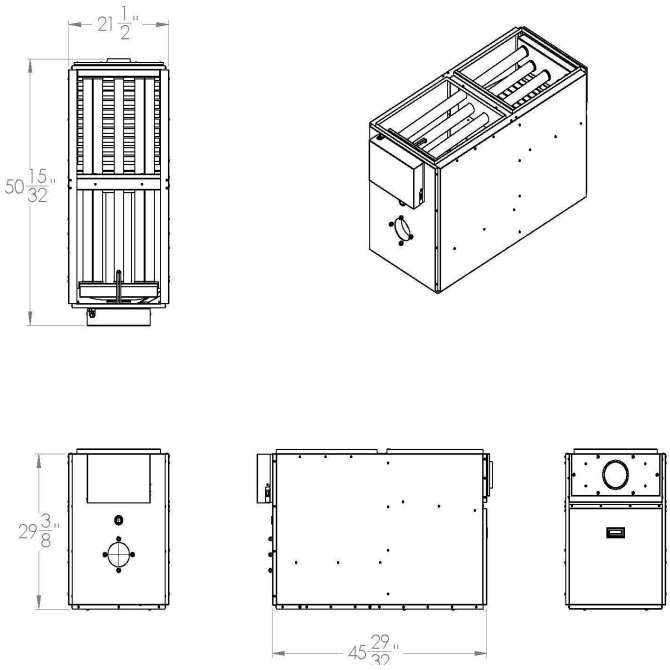

**GEMINI 3T/5T REAR (KLR)**

**PLENUM (ECLIPSE 3T) REAR / FRONT**

| | | |
|---|---|---|
| Cold air return | 18” x 20-3/4” | (457 x 527 mm) |
| Hot air supply | 18” x 21-3/4” | (457 x 552 mm) |
| Plenum spacing | 2” | (50mm) |




## ECLIPSE 3T FRONT (KLF)




## ECLIPSE 3T REAR (KLR)

# 3.0 FURNACE INSTALLATION

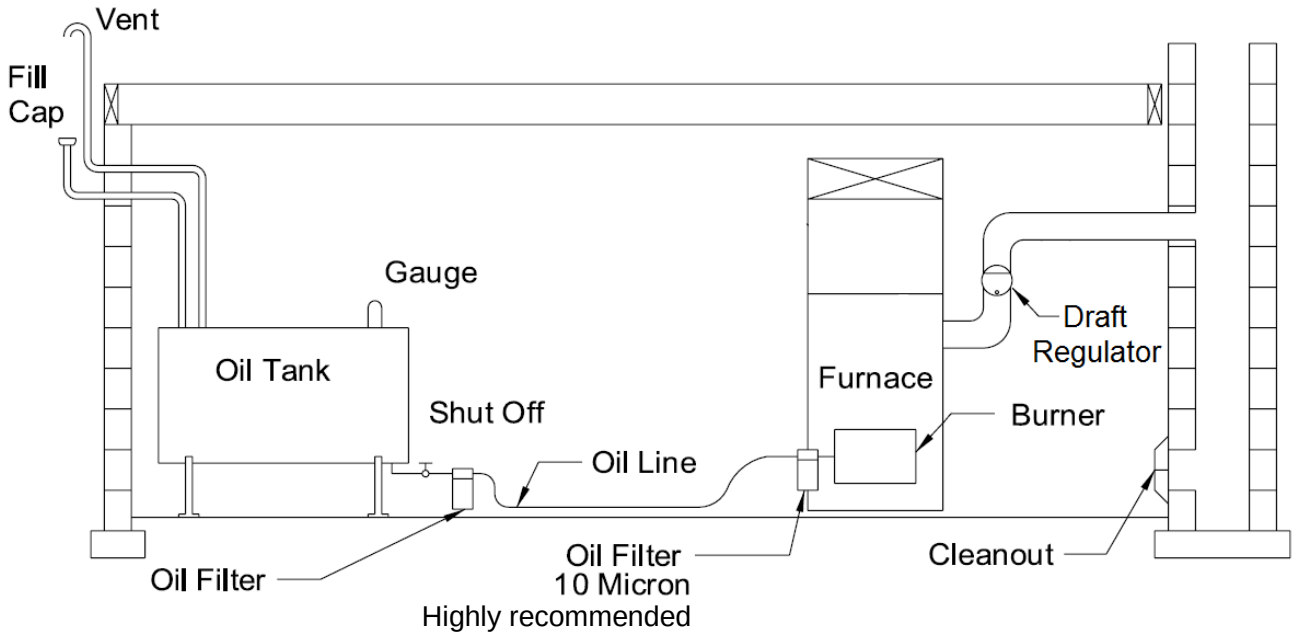
## OIL TANK & PIPING

**Tank installation must conform to local requirements.**

Install according to the applicable code such as CSA B139. Minimize number of connections in suction line and make all connections air tight. Use a pipe joint compound suitable for oil on all pipe threads. To reduce possibility of air leaks, tighten stem packing gland nut on any valves installed in the suction line. Also, be sure the oil filter is tight, as filter gaskets often shrink. Check for kinks in the oil lines as well as for possible air pockets and for loose connections. Two filters as shown below are recommended. Optional tank gauge protectors and outlet protectors are available at your local dealer.

**ONE PIPE SYSTEM** Where the tank outlet is above the burner and when the oil flows by gravity to the oil pump, a single-stage fuel unit with a single oil line to the pump may be used.

**TWO PIPE SYSTEM** When a single line is not suitable, use double line or contact your dealer for special oil line fittings. Install by-pass plug on burner fuel pump as specified in the burner manual.




**REAR FLUE FURNACE ILLUSTRATION**

**Oil Tank and Piping**

## PLACEMENT & VENTING

Furnace installation shall conform to the required installation code for oil-fired equipment Canada: CSA B139).

**FLOOR SUPPORT** COMBUSTIBLE – If required, support furnace on five (5) concrete blocks. Make sure the center of the furnace base is supported. For a furnace installed on a combustible floor, consult the applicable code and authorities having jurisdiction on this application. The floor must support the weight.

**CHIMNEY/VENT** Connect the furnace to a chimney/vent system of size and condition required by the CSA B139 (Canada) code. Furnace is approved for factory built chimney type "L" vents. Breech is certified for 5" vent pipe. Keep vent/flue pipe as short as possible with min. 1/4" per foot upward slope. Vent/flue pipes MUST NOT pass through a ceiling. Maximum flue gas temperature is 575℉.

**CONDENSATION** **If you have condensation in your chimney, make sure that the chimney size is according to the tables in CSA B139. The temperature at the base of the chimney can be increased by insulating the flue-pipe between the furnace and the chimney base. If this is not sufficient, consider cutting or removing some flue baffles in the furnace. BE AWARE THAT REMOVING BAFFLES REDUCES THE UNIT'S EFFICIENCY AND A MODIFIED UNIT IS NO LONGER ENERGY STAR APPROVED.**

**COMBUSTION & VENTILATION AIR** Install openings and ductwork to the furnace room providing fresh outside combustion and circulation air for cooling the furnace casing, as installation code requires Canada CSA B139). If installed in a closed room, provide two free air ventilation openings of at least 8" x 12" (96 sq. in.) free flow area near ceiling and floor. Oil burners must have sufficient air to allow vent systems to operate properly.

**BREECH DRAFT** Use approved draft control supplied for 5" pipe. Set draft pressure of the flue to -0.01" wc. minimum

**ELECTRICAL** Wire according to the National Electrical Code (Canadian Electrical Code in Canada) or local codes. Use a separately fused #12 electrical line directly from the service panel to the furnace junction box. Install a manual shut-off switch at the door or stairway to furnace room so furnace can be shut off remotely.

**CLEARANCES** Before placing unit, review installation clearances as shown on furnace operating decal or section **PRODUCT INFORMATION** (page 3).

**LOCATION** Install the furnace close to chimney and central to ductwork.

# 4.0 ACCESSORIES INSTALLATION

## BLOCKED VENT SWITCH (BVSO) FOR CANADIAN APPLICATION ONLY

Oil-fired appliances installed in Canada require a blocked vent switch system when installed on a chimney. A safety switch is included with the furnace to perform this function. It is the installer's responsibility to install the switch in accordance with the instructions provided. Not applicable for direct vent systems. **Field Controls Model: WMO-1 (Manual Reset)**

**Switch Operation**
Blocked vent switches are flue gas safety devices for detecting spillage of flue gases due to a blocked flue or inadequate draft. After detecting a problem, the switch de-energizes the system's burner control.
**NEVER reset the switch unless the cause of the blockage has been corrected.**

### Installation

1) Drill a 5/8" hole in to the flue vent pipe near the appliance breech connection.
2) This hole must be before the draft regulator, vertically or horizontally.
3) Remove one of the securing nuts from the threaded tube of the safety switch.
4) Tighten the other securing nut onto the pipe as far as possible (Figure 1).
5) Insert the threaded tube end into the pierced hole of the flue vent pipe.
6) Install the securing nut on the safety switch tube, which protrudes into the flue vent pipe. Tighten the nut securely (Figure 1).

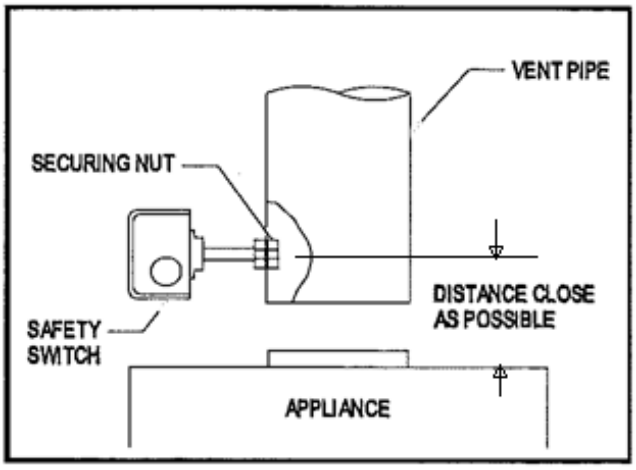



**Figure 1 -** Illustration from the instruction manual of Field Controls

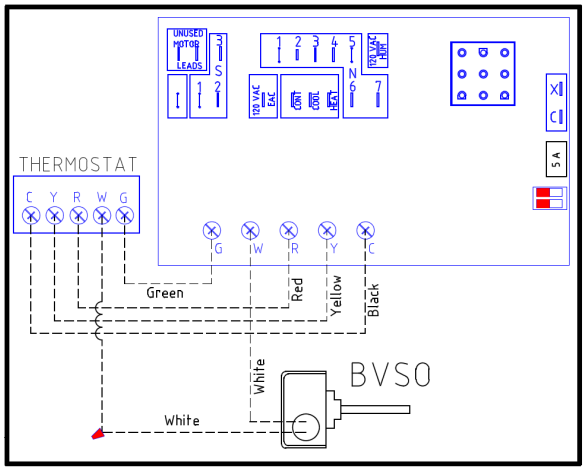



**Figure 2 -** BVSO wiring diagram

**Wiring Instructions (BVSO)**
**Caution:** Disconnect the electrical power when wiring the unit.

Wire the blocked vent switch in accordance with The National Electrical Code and applicable local codes. Wire the safety switch (BVSO) in series with the thermostat and the fan timer relay control (Figure 2).

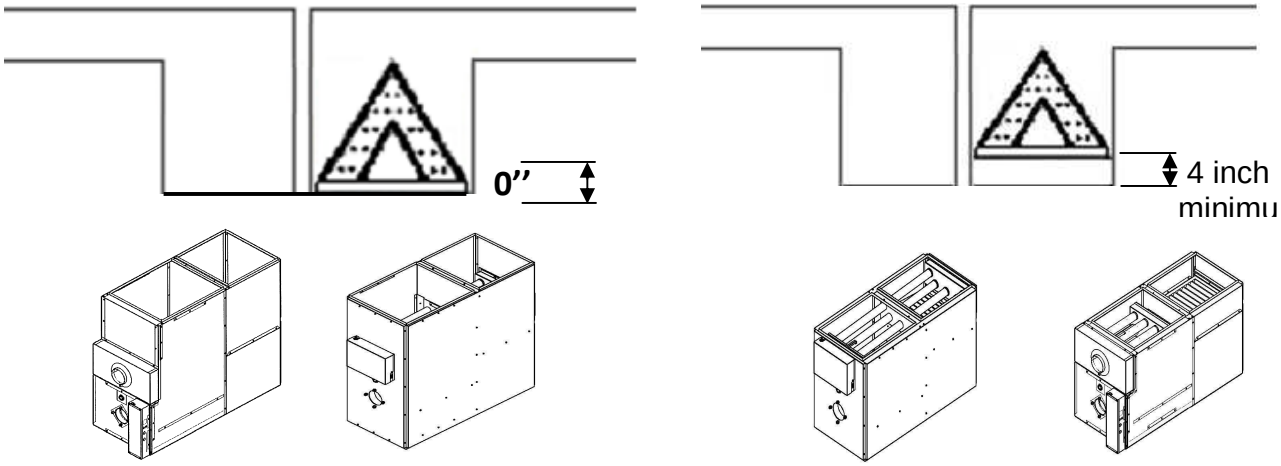
**System Test Procedure (BVSO)**

1) With the power re-established, block the chimney or vent pipe downstream of the switch.
2) Adjust the thermostat to call for heat.
3) Once the heating system has started the blocked vent switch should shut down the burner within 10 minutes or sooner.
4) Once the system has cooled, the blocked vent switch can manually be reset.
5) This procedure should be tested a second time.
6) After testing the blocked vent switch the chimney should be cleared of obstruction and the heating system should be tested over a long run cycle.

If the block vent switch shuts down the system, check to ensure there is enough draft in the chimney and venting pipes.

## AIR CONDITIONING

An air conditioning coil may be installed on the supply side **only**. Coils installed on the return side will cause condensation on the heat exchanger; this will shorten the heat exchanger life and may cause products of combustion to enter the house. Wire as per wiring label and diagram. **Height of the coil above the unit supply shall be at least 4" (102 mm) for the ECLIPSE and 0'' for the GEMINI.**




**GEMINI 3T/5T** **ECLIPSE 3T**

**See A/C coil Manufacturers Requirements.**
**To check the AC coil total air flow resistance, see procedure at page 26**

## HUMIDIFIER

If a humidifier is installed ensure that no water can drip or run from it into the furnace. This would cause deterioration and void the furnace warranty.

## 5.1 ASSEMBLY & INSTALLATION OF BURNER

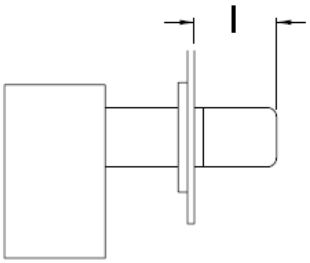
**ASSEMBLY** Check that the burner model is correct for furnace rating required. Assemble as per burner manufacturer's instructions.

**SELECT NOZZLE** Select oil input, nozzle and burner configuration as shown on furnace operating decal.

**INSTALL NOZZLE** Install selected nozzle, check for clean seating and tighten in nozzle adaptor.

**ELECTRODES** See burner manufacturer's instructions for correct setting

**INSERTION**




BURNER INSERTION (I)

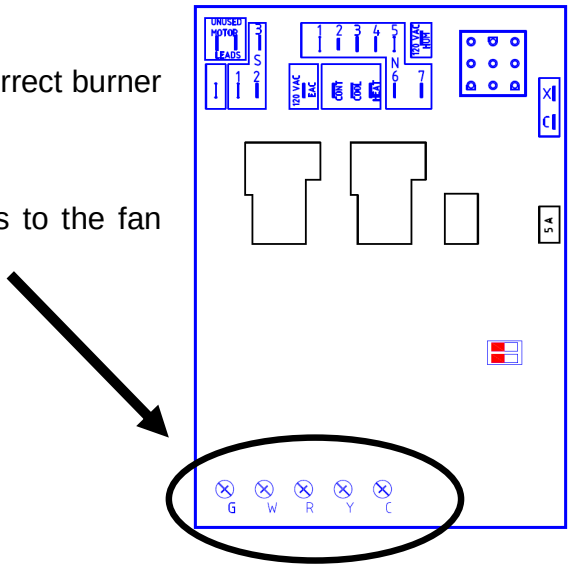
| | in | mm |
|---|---|---|
| RIELLO | 2 1/2 | 63 |

**MOUNT BURNER** Tighten top nut first so burner tips down slightly. The burner is always installed in an upright position by four (4) nuts.

**PUMP BY-PASS PLUG** For one pipe system factory setting (no plug).

**WIRING** Refer to wiring diagram for correct burner connections (see page 23).

**THERMOSTAT** Connect the thermostat wires to the fan timer control board (ST9103).



## 5.2 SET BURNER FOR EFFICIENT OPERATION

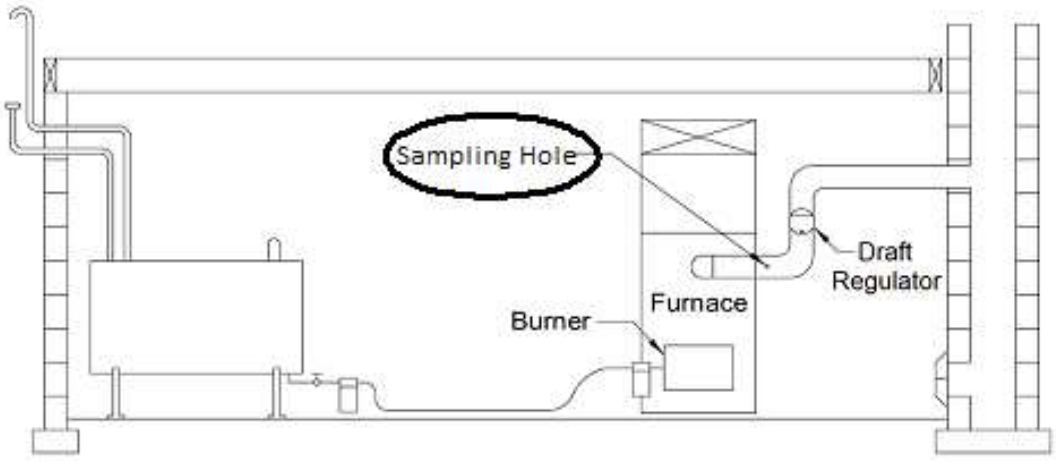
**BURNER SETTING** Use burner settings in the table on page 13 and 14 or operating decal as a guide to set burner, particularly for nozzle changes. **Those settings are only starting points for the adjustments and are not meant as final settings.**

**PUMP PRESSURE** Refer to the table on page 13 and 14 or operating decal.

**AIR SETTING** Use air settings on page 13 and 14 as a guide to set air adjustment. **Those settings are only starting points for the adjustments and are not meant as final settings.**

**DRAFT REGULATOR** The draft regulator should be installed at least 3 flue pipe diameter from breeching or elbow of the furnace.

**SAMPLING HOLE** On smoke/vent pipe, drill a 3/8" round opening. The hole should be at least 2 flue pipe diameter from breeching or elbow of the furnace.



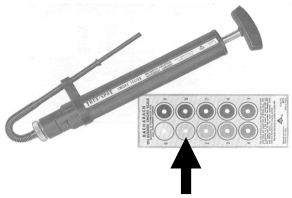

**FRONT FLUE FURNACE ILLUSTRATION**

**DRAFT PRESSURE** Using an accurate draft meter; adjust the draft control to obtain a minimum of -0.01" wc draft pressure at the breech sampling hole. The draft regulator's adjustments should be made after furnace has been running under heating mode for at least 5 minutes.

**COMBUSTION TEST** **All your tests must be done with the burner cover on**

**COMBUSTION SETTING/ EFFICIENCY**

After 10 minutes of normal operation, take a smoke test and adjust the burner to obtain a reading of "1" on the smoke scale**.** Take a $CO_2$ test and note the result.



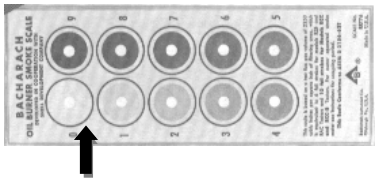
To reach the maximum smoke test value, a 10 full slow steady pump action is required.

**Open the air band adjustment on the burner to reduce your $CO_2$ reading by 1%.**

**CO2 test can be done mechanically or electronically**

(18 full slow steady pump action)

**You now have a perfect "slight trace" of smoke.**




## Relation between % of $CO_2$ and $O_2$

| $CO_2$ (%) | $O_2$ (%) | Excess Air (%) |
|---|---|---|
| 13.5 | 2.6 | 15.0 |
| 13.0 | 3.3 | 20.0 |
| 12.5 | 4.0 | 25.0 |
| 12.0 | 4.6 | 30.0 |
| 11.5 | 5.3 | 35.0 |
| 11.0 | 6.0 | 40.0 |

# 5.3 TECHNICAL INFORMATION / SET-UP

| KLR/KLF Series | (KLR) ECLIPSE 3T / GEMINI 3T REAR | | | (KLF) ECLIPSE 3T / GEMINI 3T FRONT | | |
|---|---|---|---|---|---|---|
| **Riello Burner** | F3 | | | F3 | | |
| Unit Model | KLR-E1-*067-03 | KLR-E1-*079-03 | KLR-E1-*091-03 | KLF-E1-*067-03 | KLF-E1-*079-03 | KLF-E1-*091-03 |
| Firing Rate (USGPH) | 0.55 | 0.65 | 0.75 | 0.55 | 0.65 | 0.75 |
| Input (BTU/h) | 77,000 | 91,000 | 105,000 | 77,000 | 91,000 | 105,000 |
| Output (BTU/h) | 67,000 | 79,000 | 91,000 | 67,000 | 79,000 | 91,000 |
| Nozzle | 0.40 70A | 0.60 70W | 0.65 70W | 0.40 70A | 0.60 70W | 0.65 70W |
| Pump Pr. 2 pipes sys. (psi) | 190 | 145 | 145 | 190 | 145 | 145 |
| Pump Pr. 1 pipe sys. (psi) | 190 | 165 | 165 | 190 | 165 | 165 |
| Turbulator Setting | 0 | 0 | 0 | 0 | 0 | 0 |
| Air Gate Adjustment | 1.75 | 2 | 2.35 | 1.75 | 2 | 2.35 |
| Energy Star Approved | YES | YES | YES | YES | YES | YES |
| AFUE (% | 86.8 | 87.0 | 86.2 | 86.8 | 87.0 | 86.2 |
| **$CO_2$ (%)** | **12.0** | **12.5** | **13.0** | **12.0** | **12.5** | **13.0** |

## General Information

### PSC motor info

| | | | | | | |
|---|---|---|---|---|---|---|
| Temperature Rise (°F) | 55 – 85 | 55 – 85 | 55 – 85 | 55 – 85 | 55 – 85 | 55 – 85 |
| Blower Speed (0.2'' wc) | M-LOW | M-LOW | M-LOW | M-LOW | M-LOW | M-LOW |
| Blower Speed (0.5" wc) | M-HIGH | M-HIGH | HIGH | M-HIGH | HIGH | HIGH |

### Energy Star ECM motor (0.2'' wc to 0.5'' wc static pressure)

| | | | | | | |
|---|---|---|---|---|---|---|
| Temperature Rise (°F) | 40-70 | 45-75 | 55-85 | 55-85 | 55-85 | 60-85 |
| Blower Speed | M-LOW | M-LOW | M-LOW | M-LOW | M-LOW | M-LOW |

### Static Pressure at 0.2" WC / 0.5" WC
**(PSC MOTOR / ECM MOTOR)**

### Blower speed / CFM

| Blower Speed | GEMINI 3T (REAR) **PSC** | | GEMINI 3T (REAR**)** **ECM** | |
|---|---|---|---|---|
| | 0.2" wc | 0.5" wc | 0.2" wc | 0.5" wc |
| HI | 1500 | 1300 | 1500 | 1300 |
| MHI | 1300 | 1200 | 1300 | 1200 |
| MED | --- | --- | 1200 | 1100 |
| MLO | 1100 | 1000 | 1100 | 1000 |
| LO | 875 | 850 | 775 | 750 |

| Blower Speed | GEMINI 3T (FRONT) **PSC** | | GEMINI 3T (FRONT**)** **ECM** | |
|---|---|---|---|---|
| | 0.2" wc | 0.5" wc | 0.2" wc | 0.5" wc |
| HI | 1500 | 1300 | 1500 | 1300 |
| MHI | 1350 | 1300 | 1350 | 1300 |
| MED | --- | --- | 1275 | 1200 |
| MLO | 1200 | 1100 | 1200 | 1100 |
| LO | 875 | 850 | 775 | 775 |

| Blower Speed | ECLIPSE 3T (REAR) **PSC** | | ECLIPSE 3T (REAR**)** **ECM** | |
|---|---|---|---|---|
| | 0.2" wc | 0.5" wc | 0.2" wc | 0.5" wc |
| HI | 1400 | 1250 | 1400 | 1250 |
| MHI | 1300 | 1200 | 1325 | 1225 |
| MED | --- | --- | 1275 | 1200 |
| MLO | 1200 | 1150 | 1200 | 1125 |
| LO | 875 | 850 | 775 | 750 |

| Blower Speed | ECLIPSE 3T (FRONT) **PSC** | | ECLIPSE 3T (FRONT**)** **ECM** | |
|---|---|---|---|---|
| | 0.2" wc | 0.5" wc | 0.2" wc | 0.5" wc |
| HI | 1400 | 1250 | 1400 | 1250 |
| MHI | 1300 | 1200 | 1325 | 1225 |
| MED | --- | --- | 1275 | 1200 |
| MLO | 1200 | 1150 | 1200 | 1125 |
| LO | 875 | 850 | 775 | 750 |

| KLR/KLF Series | GEMINI 5T REAR | | | GEMINI 5T FRONT | | |
|---|---|---|---|---|---|---|
| **Riello Burner** | F5 | | | F5 | | |
| Unit Model | KLR-E3-*109-05 | KLR-E3-*127-05 | KLR-E3-*139-05 | KLF-E3-*109-05 | KLF-E3-*127-05 | KLF-E3-*139-05 |
| Firing Rate (USGPH) | 0.90 | 1.05 | 1.15 | 0.90 | 1.05 | 1.15 |
| Input (BTU/h) | 126,000 | 147,000 | 161,000 | 126,000 | 147,000 | 161,000 |
| Output (BTU/h) | 109,000 | 126,000 | 139,000 | 109,000 | 126,000 | 139,000 |
| Nozzle | 0.75 70W | 0.85 70W | 1.00 70W | 0.75 70W | 0.85 70W | 1.00 70W |
| Pump Pr. 2 pipes sys. (psi) | 145 | 165 | 145 | 145 | 165 | 145 |
| Pump Pr. 1 pipe sys. (psi) | 165 | 175 | 165 | 165 | 175 | 165 |
| Turbulator Setting | 0 | 1 | 2 | 0 | 1 | 2 |
| Air Gate Adjustment | 2 | 2.25 | 2.25 | 2 | 2.25 | 2.25 |
| Energy Star Approved | YES | YES | YES | YES | YES | YES |
| AFUE (% | 88.0 | 87.40 | 86.80 | 88.0 | 87.40 | 86.80 |
| **$CO_2$ (%)** | **12.5** | **13.5** | **13.5** | **12.5** | **13.5** | **13.5** |

## General Information

### PSC motor info

| | | | | | | |
|---|---|---|---|---|---|---|
| Temperature Rise (℉) | 55 – 85 | 55 – 85 | 55 – 85 | 55 – 85 | 55 – 85 | 55 – 85 |
| Blower Speed (0.2'' wc) | M-LOW | M-HIGH | M-HIGH | M-LOW | M-HIGH | M-HIGH |
| Blower Speed (0.5" wc) | M-HIGH | HIGH | HIGH | M-HIGH | HIGH | HIGH |

**Energy Star ECM motor** (0.2'' wc to 0.5'' wc static pressure)

| | | | | | | |
|---|---|---|---|---|---|---|
| Temperature Rise (℉) | 55-85 | 55-85 | 60-85 | 55-85 | 55-85 | 60-85 |
| Blower Speed | M-LOW | MEDIUM | M-HIGH | M-LOW | MEDIUM | M-HIGH |

### Static Pressure at 0.2" WC / 0.5" WC
**(PSC MOTOR / ECM MOTOR)**

### Blower speed / CFM

| Blower Speed | GEMINI 5T (REAR) **PSC** | | GEMINI 5T (REAR**)** **ECM** | |
|---|---|---|---|---|
| | 0.2" wc | 0.5" wc | 0.2" wc | 0.5" wc |
| HI | 1900 | 1800 | 2000 | 1910 |
| MHI | 1800 | 1700 | 1900 | 1385 |
| MED | --- | --- | 1690 | 1660 |
| MLO | 1550 | 1450 | 1610 | 1575 |
| LO | 1050 | 1000 | 1060 | 1010 |

| Blower Speed | GEMINI 5T (FRONT) **PSC** | | GEMINI 5T (FRONT**)** **ECM** | |
|---|---|---|---|---|
| | 0.2" wc | 0.5" wc | 0.2" wc | 0.5" wc |
| HI | 1900 | 1800 | 2000 | 1910 |
| MHI | 1800 | 1700 | 1900 | 1385 |
| MED | --- | --- | 1690 | 1660 |
| MLO | 1550 | 1450 | 1610 | 1575 |
| LO | 875 | 1050 | 1000 | 1010 |

# 6.0 FURNACE OPERATION AND SETTINGS

## SHUTTING FURNACE DOWN

**POWER OFF** Turn off main power breaker or disconnect.

**FUEL OFF** Shut off manual fuel supply valve.

Always keep manual fuel supply valve shut off if the burner is shut down for an extended period of time.

## RESTARTING FURNACE

Follow this procedure before restarting a unit that has been shut down for an extended period of time.

**INSPECTION** Have the furnace/system serviced and inspected by a **qualified technician**.

**FUEL** Turn on fuel supply and check that there are no leaks.

**POWER** Turn on power and check that the furnace starts and operates as usual.

**OPERATION** If the furnace/system fails to operate or operates in an unusual manner, call your service technician. If the burner fails to operate at any time, call a qualified burner technician.

# 6.1 BLOWER SETTING

**Ensure power is off when adjusting blower setting**. For heating, use the blower speeds shown on the furnace specifications to give a temperature rise according to the technical information tables on page 13 and 14. The Lo blower speed can be used for air circulation when heating or cooling are not required. Set blower speeds to match the installation requirements.

## FAN & LIMIT CONTROL

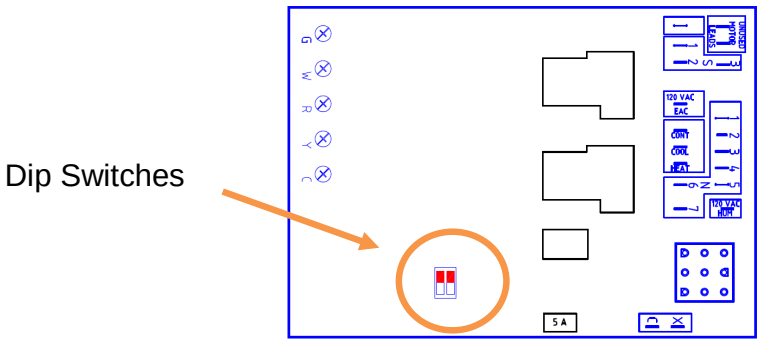
| | |
|---|---|
| Limit | 185℉ – Factory set |
| Fan On | 45 seconds after the burner starts |
| Fan Off | Adjustable on board (see page 16) |

## THERMOSTAT ANTICIPATOR SETTING

Adjust to thermostat manufacturer's instruction.

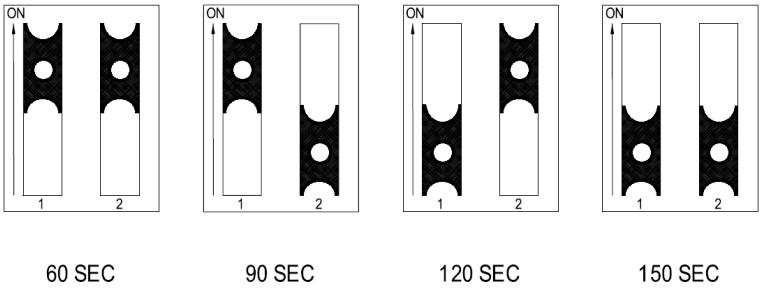
## 6.2 FAN TIMER CONTROL BOARD (ST9103A 1028)

- "FAN OFF" Dip Switches adjustment




## COMFORT ADJUSTMENTS

- Outlet air consistently too warm or too cold - change the blower motor speed to give the specified air temperature rise.
- Outlet air gets too warm and burner shuts down - increase air by changing the blower motor speed to give the specified temperature rise.
- Outlet air is too cold or too warm at the end of the heating cycle after the burner has turned off - adjust the "FAN OFF" dip switch on fan timer control board. Refer to the next figure.




"FAN OFF" Dip Switch
Dip Switch adjustment (90 seconds) on all unit input

## OFF CYCLE AIR CIRCULATION (Factory settings)

**LO SPEED** All GEMINI and ECLIPSE models have the low speed switch for optional constant air circulation during the furnace off cycle.

**"FAN ON"** When "FAN ON" is selected on the thermostat, the blower will run constantly at the blower speed selected on the heating terminal. This is the equivalent of jumping terminals R and G on the ST9103 board.

## 6.3 ST9103A 1028 CONTROL BOARD SEQUENCE

### ST9103 Heating Sequence

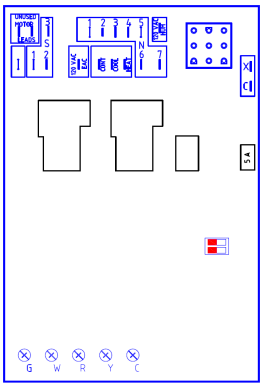
1) Thermostat calls for Heat.
2) Burner starts
3) Blower starts after **45** seconds
4) Burner shuts down after call for heat is satisfied
5) Blower stops according to adjusted (FAN OFF) Dip switch selection

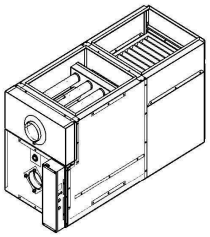
### ST9103 Cooling Sequence

1) Thermostat calls for cooling
2) Blower starts immediately
3) Cooling unit starts
4) Blower stops immediately after cooling demand is satisfied
5) Cooling unit stops

Honeywell ST9103A 1028 Electronic Board find in the **electric box** in front of each unit,

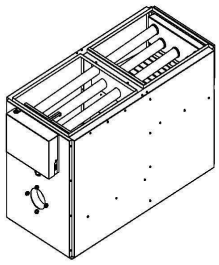
## KLR / KLF

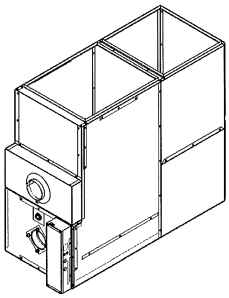


**ECLIPSE 3T FRONT**

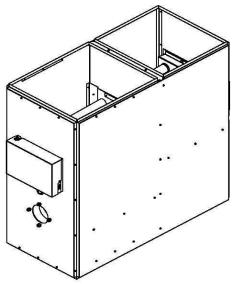
**ECLIPSE 3T REAR**





**GEMINI 3T/5T FRONT**

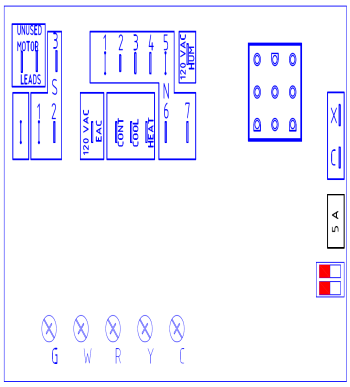
**GEMINI 3T/5T REAR**



## 6.4 Servicing - Fan Timer ST9103A 1028

### Trouble shooting the Honeywell electronic board ST9103

**Before trouble shooting the board, check for the 5 amp. fuse**



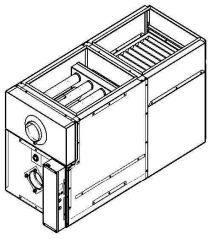

**For accurate trouble shooting, follow step by step the Trouble Shooting Chart.**

| Step | Possible Cause | Check-out procedure | Corrective action |
|---|---|---|---|
| | | **No Heat** | |
| 1 | Incoming supply | Check for 120 Volts between terminal S2 and 3 on electronic fan control | **Yes - Move to next step**<br>No - Check breaker main power switch |
| 2 | Transformer | Check for 120 Volts between terminal S3 and 4 on electronic fan control.<br>Check for 24 Volts between terminal X and C on electronic fan control | **Yes - Move to next step**<br>No - Check for bad connection<br>**Yes - Move to next step**<br>No - Change Transformer |
| 3 | Electronic Fan control | Check for 24 Volts between R and C<br>Check for 24 Volts between terminal W and C | **Yes - Move to next step**<br>No - Change the electronic board<br>**Yes - Move to next step**<br>No - Check thermostat and wiring |
| 4 | **Warning: Make sure the quick connect cable is fully inserted on the board** | | |
| | Limit Control | Check for 120 Volts on each terminal of the two limits<br>Check for 120 Volts coming from the main plug-in of the electronic fan control to the limit control<br>Check for 120 Volts coming out of the limit control | **Yes - Move to step # 5**<br>No - Move to next step<br>**Yes - Move to next step**<br>No - Change the electronic fan control<br>**Yes - Move to step # 5**<br>No - Failure on the limit control circuit<br>. Temperature too high<br>. Bad limit control |

| Step | Possible Cause | Check-out procedure | Corrective action |
|---|---|---|---|
| **No Heat** | | | |
| 5 | Riello burner application | Check for 120 Volts on the black wire, contact (COM) on the burner activation relay<br>Check if oil primary control is on reset<br>Check for continuity between the two wires yellow and violet on the burner activation relay<br>Check for 120 Volts on the contact (No) of the burner activation relay<br>Check for 120 volts on the orange wire coming to the burner (L) | **Yes - Move to next step**<br>No - Back to step # 4 or check for bad connection<br>**Yes - Press reset button**<br>No - Move to the next step<br>**Yes - Move to next step**<br>No - Change the electronic fan control<br>**Yes - Move to next step**<br>No - Change the burner activation relay<br>**Yes - Failure on the burner**<br>No - Change the electronic fan control |
| 6 | Blower<br>▪ Low speed<br>Check if the constant low speed switch is **ON** | Check for 120 Volts at the "CONT" terminal on the electronic fan control<br>Check for 120 Volts on both side of the constant low speed switch | **Yes - Move to next step**<br>No - Change the electronic fan control<br>**Yes - Check "LOW" speed on the blower motor**<br>No - Change the switch |

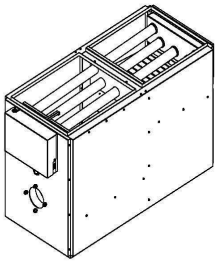
| | | | |
|---|---|---|---|
| **No Cooling** | | | |
| 7 | Blower<br>High speed . | Check for 24 Volts between G and C on electronic fan control<br>Check for 120 Volts at the "COOL" terminal of the electronic fan control | **Yes - Move to next step**<br>No - Check thermostat and wiring; if it's OK, then change the electronic fan control<br>**Yes - Check "COOL" speed on the blower motor**<br>No - Change the electronic fan control |

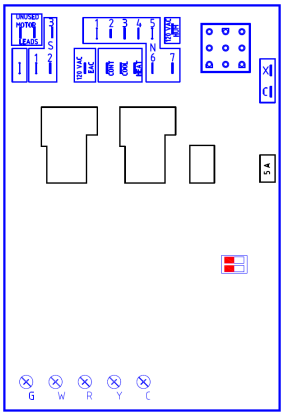
| Step | Possible Cause | Check-out procedure | Corrective action |
|---|---|---|---|
| **Electronic air filter and Humidifier** | | | |
| 8 | Condensing unit | Check for 24 volts between terminal Y and C on the electronic fan control | **Yes - Compressor ON**<br>No - Check thermostat and wiring |
| 9 | Electronic air filter | Check for 120 Volts on terminal "EAC" of the electronic fan control (thermostat must call a Heat, Cool or Fan ON demand | **Yes - Electronic filter failure**<br>No - Change the electronic fan control |
| 10 | Humidifier | Check for 120 Volts on terminal "HUM" of the electronic fan control (burner must be energized) | **Yes - Humidifier failure**<br>No - Change the electronic fan control |

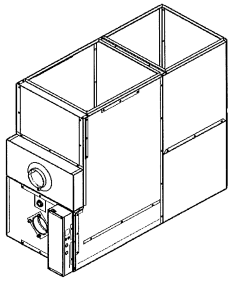


**(KLF) ECLIPSE 3T FRONT**

**(KLR) ECLIPSE 3T REAR**

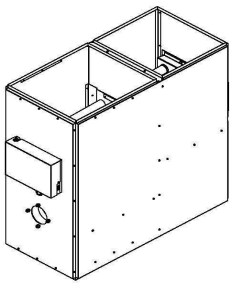






**GEMINI 3T/5T FRONT**

**GEMINI 3T/5T REAR**



# 7.0 SERVICE

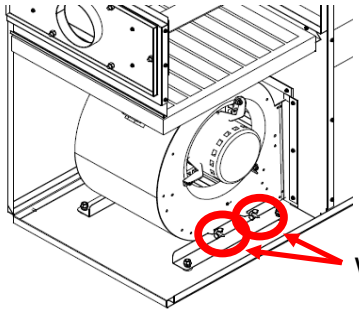
## REGULAR MAINTENANCE

Check complete operation **at least once a year**. In Canada see B139, (Maintenance), in Unites States see NFPA 31, for recommended servicing procedure. Clean flue pipes on a regular basis. Replace flue pipes if there is any sign of corrosion or other problems. Gaskets should be checked and may have to be replaced.

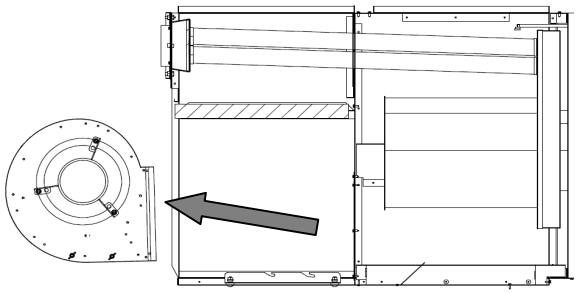
## BLOWER REMOVAL

This furnace has a blower sealing system, which is designed to be tight and rattle free. Refer to the instructions and pictures below.

1) Shut off oil and power to furnace.
2) Open blower compartment.
3) For FRONT furnace only, remove air filter.
4) Disconnect the wiring to the blower motor.
5) Remove the four (4) wing nuts securing the blower side to the base panel bracket.




6) Slide the blower toward you and then lift the blower straight up. Shift the blower out of the furnace.



Put back the blower assembly using the reverse procedure. Ensure wiring and ground wires are correctly reconnected.

## AIR FILTERS

To maintain furnace performance and safety, replace dirty filters at least once every heating season or as required. Use new approved disposable filters of the same size and type. Dirty, clogged or wrong sized filters will impair the furnace performance and may cause the furnace to shut down or overheat.

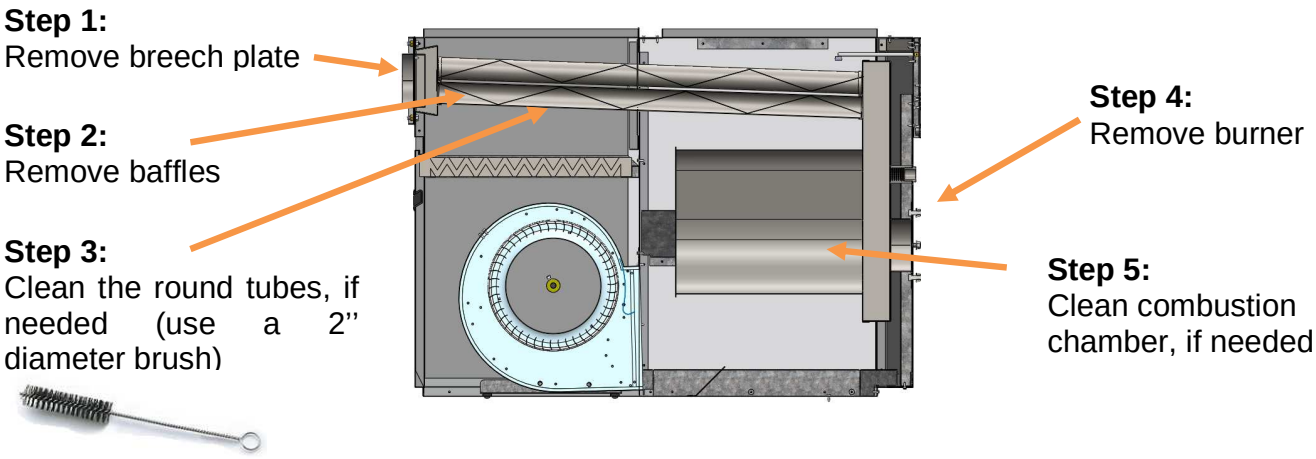
## CHANGING NOZZLE

It is recommended that the nozzle be replaced once a year. If a new nozzle of a different size is installed, change the blower speed according to section **BURNER INSTALLATION AND SPECIFICATIONS** or operating decal as required.

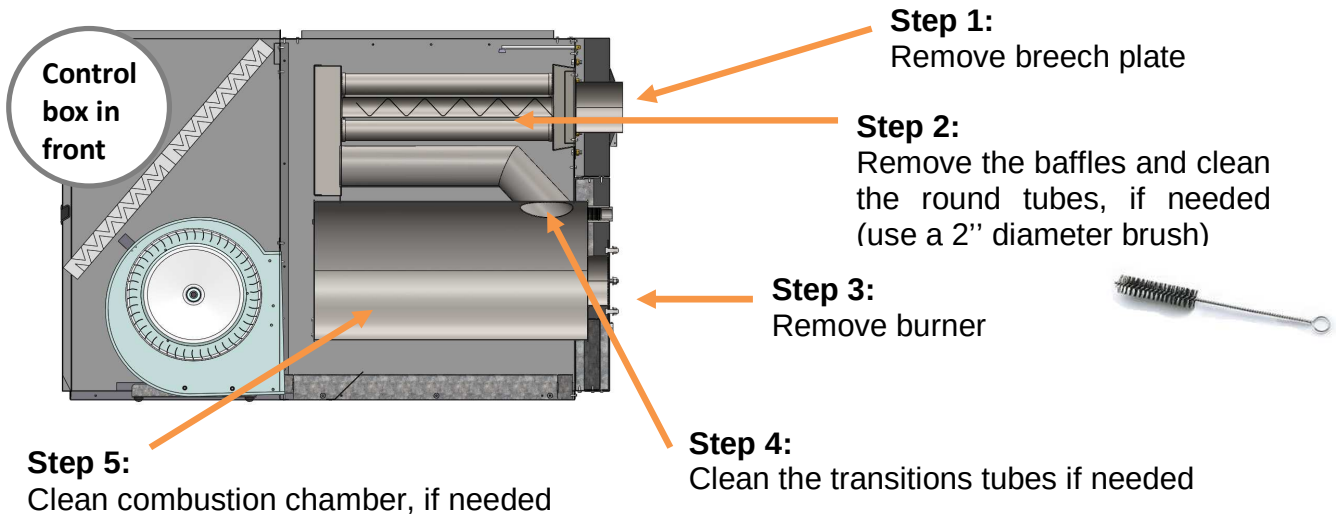
## CLEANING HEAT EXCHANGER

Heat exchanger must be inspected every heating season. Refer to instructions and pictures below.

**GEMINI 3T/5T AND ECLIPSE 3T ( REAR) HEAT EXCHANGER**



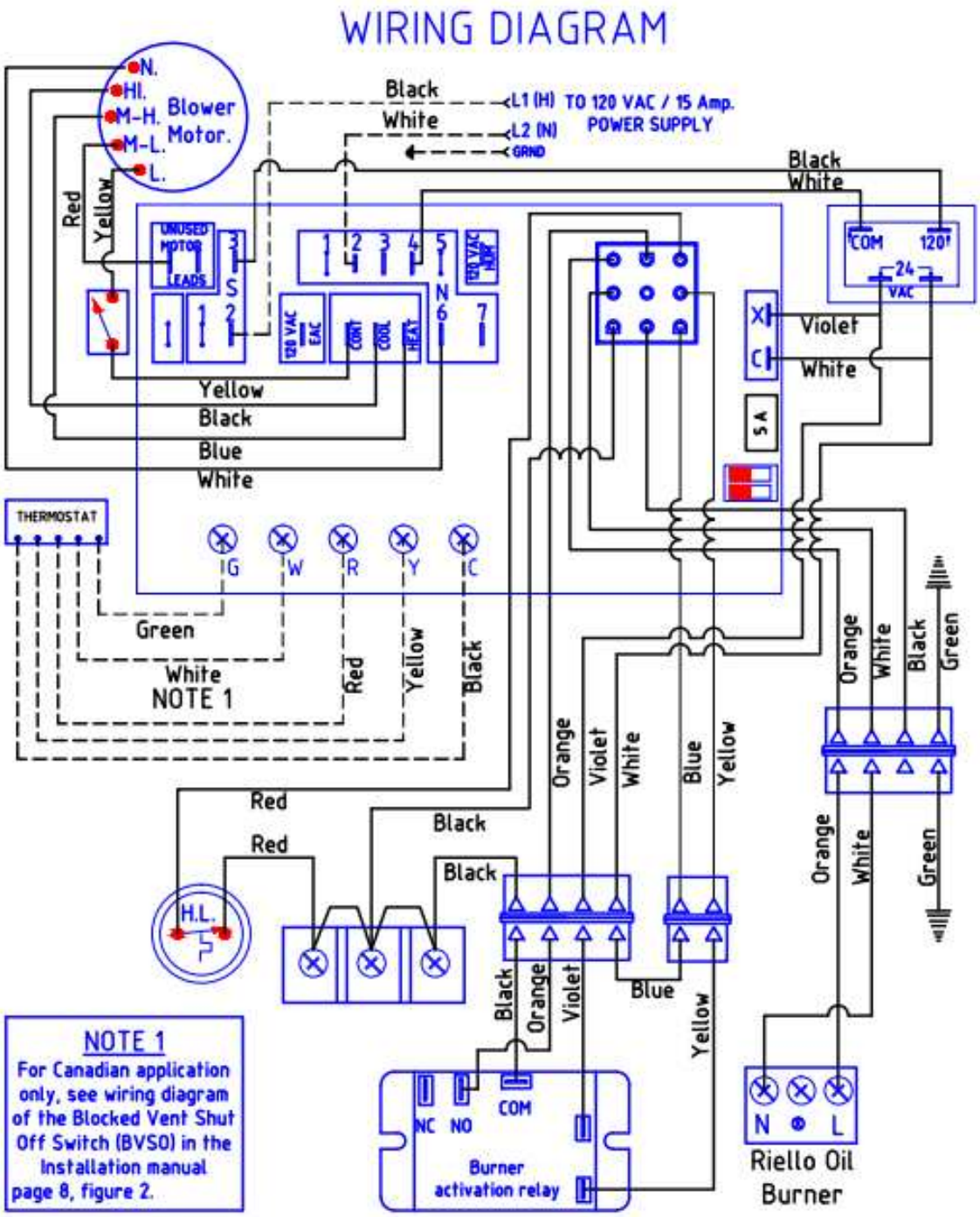

**GEMINI 3T/5T AND ECLIPSE 3T (FRONT) HEAT EXCHANGER**


Control box in front
**Step 1:**
Remove breech plate
**Step 2:**
Remove the baffles and clean the round tubes, if needed (use a 2'' diameter brush)
**Step 3:**
Remove burner
**Step 4:**
Clean the transitions tubes if needed
**Step 5:**
Clean combustion chamber, if needed

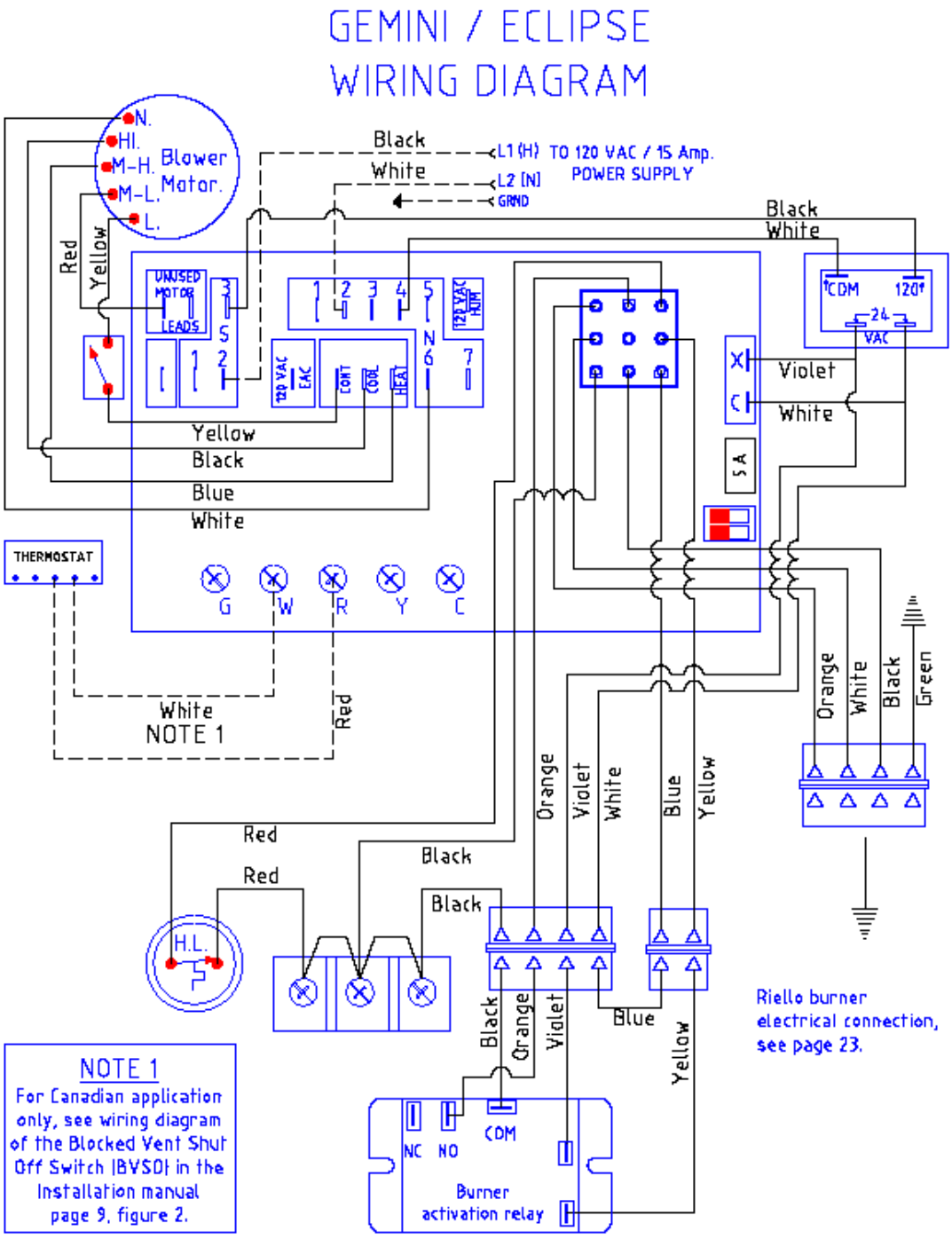
# 8.0 ELECTRICAL / WIRING DIAGRAMS

RIELLO

## HEATING & COOLING



# HEATING ONLY (2 WIRES THERMOSTAT)



# 10. START-UP TEST RESULTS

Model**:** _____ Serial Number: _____

Date of installation: _____

Installer (name & address): _____

_____

_____

**START-UP TEST RESULTS**

Size of unit (Btu/h): _____

Nozzle: _____Oil Pressure (psi): _____

Chimney_____ Direct vent system (DVS) _____

Burner adjustments:

RIELLO **F3** ___ **BF3** ___

Turbulator: _____ Air Gate _____

Smoke result: #0 _____ TRACE_____

Combustion Results: _____ $CO_2$ %

Chimney draft: _____ " W.C.

Ambient temperature: _____ ℉

Gross flue temperature: _____ ℉

Temperature rise: _____ ℉ (see page 26)

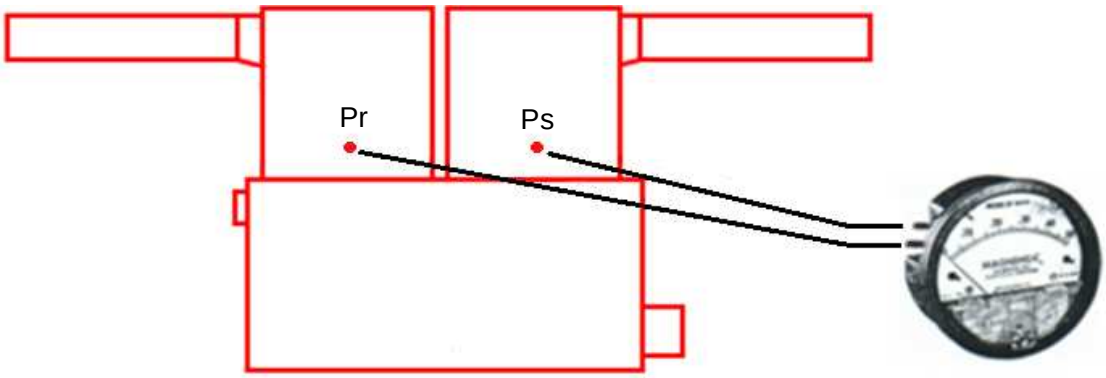
External total static pressure: _____ " W.C. (see page 26)

A/C Coil total resistance: _____ " W.C. (see page 26)

## TEST PROCEDURES

### External Total Static Pressure Reading

Total Static Pressure = Supply Pressure (Ps) + Return Pressure (Pr)

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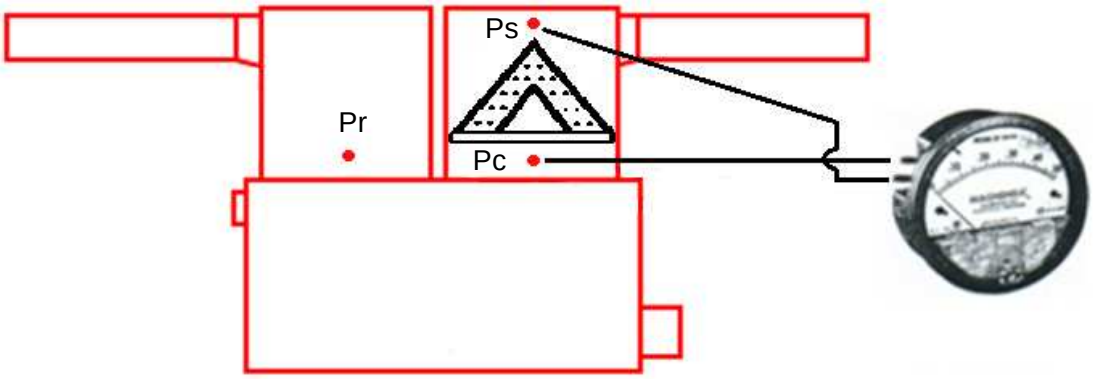
### A/C Coil Total Resistance Reading

A/C coil total resistance = Coil Pressure (Pc) - Supply Pressure (Ps)

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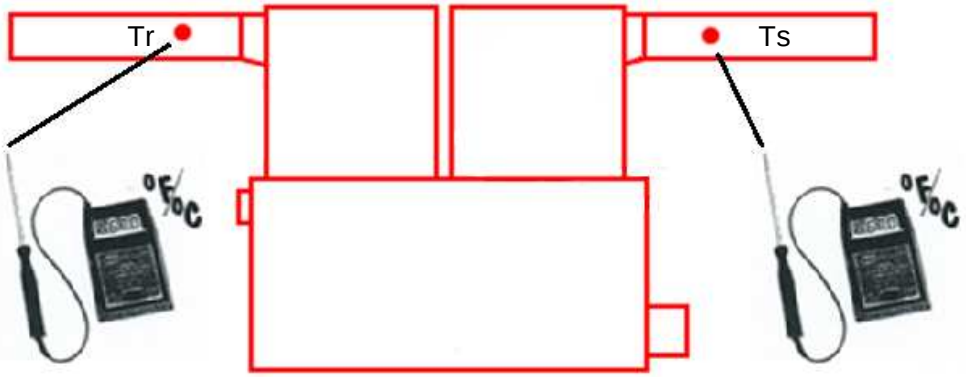
### Temperature Rise Reading ***

Temperature rise = Supply Temp. (Ts) - Return Temp. (Tr)




*** Probe must not be in direct sight of heat exchanger.

Kerr products manufactured by Granby Furnaces Inc. offer a full line of oil-fired furnaces and boilers built proudly in Parrsboro, Nova-Scotia, Canada at its 70,000 square feet facility. Kerr products are sold across Canada and the United States through a wide distribution network.

Our team of engineers, designers and technicians continually research and develop products to go beyond the demanding specifications of today's certifications.

*Thank you for choosing Kerr.*